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AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions, and listings, of claims in the present application:

1. (Original) A process for fabricating a diffusion media, said process comprising:
providing a diffusion media substrate comprising a porous fibrous matrix defining first and second major faces, wherein said substrate comprises an amount of carbonaceous material sufficient to render said substrate electrically conductive;
applying a mesoporous layer along at least a portion of one of said first and second major faces of said substrate, wherein
said mesoporous layer is applied to said substrate by providing a coating comprising a hydrophobic component, a hydrophilic component, and a pore forming agent, and
said substrate is free of fluorinated polymers outside of regions of said substrate carrying said mesoporous layer; and
decomposing said pore forming agent such that said mesoporous layer is characterized by a porosity greater than a porosity of said diffusion media substrate.
2. (Original) A process as claimed in claim 1 wherein said hydrophobic component comprises a fluorinated polymer.
3. (Original) A process as claimed in claim 2 wherein said hydrophobic component comprises PTFE.
4. (Original) A process as claimed in claim 1 wherein said coating is provided as a mixture comprising between about 15 wt% and about 40 wt% of said hydrophobic component.
5. (Original) A process as claimed in claim 1 wherein said coating is provided as a mixture comprising about 20 wt% of said hydrophobic component.

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6. (Original) A process as claimed in claim 1 wherein said hydrophilic component comprises a carbonaceous substance.

7. (currently amended) A process as claimed in claim 6 wherein said carbonaceous substance ~~is selected from~~ comprises carbon fibers, carbon particles, ~~and or~~ combinations thereof.

8. (Original) A process as claimed in claim 6 wherein said carbonaceous substance is characterized by a surface area of between about 50 cm²/g and about 250 cm²/g.

9. (Original) A process as claimed in claim 6 wherein said carbonaceous substance is characterized by a surface area of about 60 cm²/g.

10. (Original) A process as claimed in claim 6 wherein said carbonaceous substance comprises acetylene black.

11. (Original) A process as claimed in claim 1 wherein said coating is provided as a mixture comprising between about 60 wt% and about 85 wt% of said hydrophilic component.

12. (Original) A process as claimed in claim 1 wherein said coating is provided as a mixture comprising about 80 wt% of said hydrophilic component.

13. (Original) A process as claimed in claim 1 wherein said pore forming agent comprises a material selected such that said mesoporous layer is substantially free of components of said pore forming agent upon decomposition of said pore forming agent.

14. (currently amended) A process as claimed in claim 1 wherein said pore forming agent comprises a material selected to decompose in a mixture with said hydrophobic and hydrophilic components upon heating ~~above room temperature~~.

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15. (Original) A process as claimed in claim 14 wherein said pore forming agent comprises a material selected such that said decomposition is particulate free.
16. (currently amended) A process as claimed in claim 14 wherein said pore forming agent comprises a material selected such that end products of said decomposition comprises gaseous and liquid components.
17. (currently amended) A process as claimed in claim 14 wherein said pore forming agent comprises a material selected such that end products of said decomposition comprises at least one gaseous component and H₂O.
18. (Original) A process as claimed in claim 1 wherein said pore forming agent comprises ammonium carbonate.
19. (currently amended) A process as claimed in claim 1 wherein said coating is provided as a mixture comprising ~~between about 0 wt% and~~ up to about 15 wt% of said pore forming agent.
20. (Original) A process as claimed in claim 1 wherein said coating is provided as a mixture comprising about 5 wt% of said pore forming agent.
21. (currently amended) A process as claimed in claim 1 wherein a sufficient amount of said mesoporous layer is applied to said substrate to ~~substantially~~ increase a porosity of said diffusion media relative to said diffusion media absent said mesoporous layer.
22. (Original) A process as claimed in claim 21 wherein said substantial increase in said porosity of said diffusion media is between about 5% and about 15%.
23. (Original) A process as claimed in claim 21 wherein said substantial increase in said porosity of said diffusion media is about 7.5%.

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24. (Original) A process as claimed in claim 21 wherein said porosity of said diffusion media including said substrate and said mesoporous layer is about 84%.

25. (currently amended) A process as claimed in claim 1 wherein said coating further comprises a solvent ~~selected from~~ comprising H₂O, isopropanol, ~~and~~ or combinations thereof.

26. (Original) A process as claimed in claim 1 wherein said coating is provided such that it at least partially infiltrates said diffusion media substrate.

27. (Original) A process as claimed in claim 1 wherein a sufficient amount of said mesoporous layer is applied to said substrate to substantially increase an overall porosity of said diffusion media from about 78% absent said mesoporous layer to about 84% including said mesoporous layer.

28. (Original) A process as claimed in claim 1 wherein a sufficient amount of said mesoporous layer is applied to said substrate to yield a mesoporous layer thickness of between about 10 μ m and about 25 μ m.

29. (Original) A process as claimed in claim 28 wherein said diffusion media substrate is provided having a thickness of between about 100 μ m and about 300 μ m.

30. (Original) A process as claimed in claim 1 wherein said pore forming agent is decomposed by a heat treating process.

31. (Original) A process as claimed in claim 30 wherein said heat treating process is characterized by temperatures between about 75°C and about 100°C.

32. (Original) A process as claimed in claim 30 wherein said heat treating process is characterized by temperatures above about 65°C.

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33. (currently amended) A process for fabricating a diffusion media, said process comprising:

providing a diffusion media substrate comprising a porous fibrous matrix defining first and second major faces, wherein said substrate comprises an amount of carbonaceous material sufficient to render said substrate electrically conductive;

applying a mesoporous layer along at least a portion of one of said first and second major faces of said substrate, wherein

said mesoporous layer is applied to said substrate by providing a coating comprising a hydrophobic component, a hydrophilic component, a pore forming agent, and a solvent,

said hydrophobic component comprises a fluorinated polymer,

said hydrophilic component comprises a carbonaceous substance selected ~~from~~ comprising carbon fibers, carbon particles, and or combinations thereof,

said carbonaceous substance is characterized by a surface area of about $60 \text{ cm}^2/\text{g}$,

said pore forming agent comprises ammonium carbonate,

said substrate is free of fluorinated polymers outside of regions of said substrate carrying said mesoporous layer,

a sufficient amount of said mesoporous layer is applied to said substrate to substantially increase a porosity of said diffusion media relative to said diffusion media absent said mesoporous layer,

said substantial increase in said porosity of said diffusion media is between about 5% and about 15%,

said solvent ~~is selected from~~ comprises H_2O , isopropanol, and or combinations thereof, and

said coating is provided such that it at least partially infiltrates said diffusion media substrate; and

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decomposing said pore forming agent in a heat treating process such that said mesoporous layer is characterized by a porosity greater than a porosity of said diffusion media substrate.

34-38. (canceled)

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